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(54) **Assembly of components and method for constructing an air conditioning cabinet**  
Zusammenstellung von Elementen und Verfahren zum Bauen eines Klimaanlage-schutzes  
Assemblage d'éléments et méthode pour la construction d'une cabine pour le conditionnement de l'air

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**DE-A- 3 711 222** **US-A- 3 702 211**  
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## Description

A known method for constructing an air conditioning cabinet is described in the European patent application EP-A-0230083 of the same applicant, wherein an assembly of components is described for constructing an air conditioning cabinet in simple manner without it being necessary to crawl into it.

A drawback of such an air conditioning cabinet however is the large number of components required such as panels, frame parts and the like. Another drawback relates to the difficulty of constructing comparatively large air conditioning cabinets with sufficient rigidity.

A further construction for building an air conditioning cabinet is known from DE 37 11 222 A1, having the features of the preamble of claim 1.

However, this construction exhibits the problem of being susceptible to bending, especially when fitting a panel from the outside, which hinders the fitting of panels and reduces rigidity of the air conditioning cabinet.

It is an object of the present invention to obviate one or more of the stated drawbacks. The present invention therefore provides air conditioning cabinet, comprising an underframe, one or more lying frame parts and/or intermediate lying frame parts, of which the lower lying frame parts are fixed to said underframe, a number of upright frame parts and/or intermediate upright frame parts, and a number of panels including inner and outer panels and provided with fixing flanges fixed to one or more frame parts and/or intermediate frame parts, by screw means screwable from the exterior of the air conditioning cabinet wherein the frame parts and/or intermediate frame parts show a hollow construction wherein the tip ends of the screw means extend into said hollow construction, and wherein the outer surface of the inner panel is substantially aligned with the inner surface of the frame part and/or intermediate frame part to yield a substantially constant smooth inner surface, characterized in that said hollow construction of the frame parts and/or intermediate frame parts are made from a closed uninterrupted piece of metal, including one or more protruding securing portions extending at the inner side of said air conditioning cabinet aligned with the inner panel, and said securing portions having securing faces spaced both from the inner and outer side of said cabinet, to which securing face both the inner and the outer panel are secured.

In accordance with this assembly the panels have the same form, while the frame parts and intermediate frame parts are fixed to the panels without a frame first having to be constructed from these frame parts. In the first instance the rigidity of the air condition cabinet is formed by panels which are mutually joined using the frame parts and the intermediate frame parts.

Since the securing face of the securing portion is spaced from both the inner and outer side of the cabinet, the construction according to the present invention is strengthened relative to the construction disclosed in

DE 37 11 222.

The panels have flanges at either end which correspond with the form of the frame parts. The panels are joined to the frame parts by screws which are screwed through the panel flanges into the interior of the frame parts so that the screw tips do not extend into the inside of the air conditioning cabinet, when assembled.

Securing of the panels to the frame parts with screws yields the advantage that the inside of the air conditioning cabinet is easily accessed simply by unscrewing the desired panel to give a point of entry.

Since the screws are screwed into and come to rest in the interior of the frame parts, a substantially, constant, smooth inner surface of the air conditioning cabinet is ensured. This yields the advantage that no projections, such as extending screw tips, are present on the inner surfaces of the air conditioning cabinet, behind which dirt, dust and so forth can build up, which can lead to impendence of the air flow through the cabinet and can be the cause of health problems associated with unclean air conditioning systems such as legionnaire's disease.

In preference the frame parts are manufactured from rolled and/or welded steel having screw holes pre-drilled therein.

The pre-drilling of the screw holes in the frame parts manufactured outside the factory facilitates assembly of the air conditioning cabinets and ensures that no unwanted points of stress and strain, which can lead to instability, are brought into the air conditioning cabinets which is a possible result of assembling and installing the cabinet and then drilling screw holes in order to secure the cabinet together.

The corresponding panel flanges and form of the frame parts yield a compact, resilient and relatively light weight, elegant construction for the air conditioning cabinet, when these are screwed together.

Sealing strips are preferably provided between the panel flanges and the frame parts, the screws joining the panel flanges to the frame parts by being screwed through these sealing strips.

Covering strips are preferably provided for covering the parts of the screws which are exposed to the open air.

The sealing strips plus covering strips help to reduce the rusting effect of condensation on the screws which results for temperature changes experienced by the air conditioning cabinet when in use. The covering strips also provide a smooth and plain appearance of the outer wall of the cabinet.

The intermediate frame parts also serve for mutual fixing of the panels without the parts having to be arranged prior to the panels being attached thereto.

The intermediate frame parts preferably have a shape such that a covering strip can be snapped thereon.

Further advantages, features and details of the present invention will become apparent in the light of a

description of preferred embodiments thereof with reference to the annexed drawing, in which:

Fig. 1 shows a perspective view of an air conditioning cabinet constructed according to a method of the present invention;

Fig. 2 and 3 respectively show perspective views of the constructing of the underframe of the assembly of components according to the present invention;

Fig. 4 is a perspective view of the assembly of components for constructing the air conditioning cabinet according to the present invention;

Fig. 5 shows a section along line V-V of fig. 1;

Fig. 6 shows a section along line VI-VI of fig. 1;

Fig. 7 shows a section along line VII-VII of fig. 1;

Fig. 8 shows a section through an alternative embodiment (not further shown) of an assembly of components for constructing the air conditioning cabinet according to the present invention;

Fig. 9 shows a view, partly in perspective and partly in section, of a number of components of a preferred embodiment of an assembly for constructing an air conditioning cabinet according to the present invention.

Fig. 10 shows a sectional view of a number of components from a preferred embodiment of an assembly for constructing an air conditioning cabinet according to the present invention; and

Fig. 11 is a perspective view of a component from a preferred embodiment of an assembly for constructing an air conditioning cabinet according to the present invention.

An air conditioning cabinet 1 (fig. 1), in which is incorporated apparatus such as a ventilator, filters and optionally an air humidifier etc., comprises panels 2, frame parts 3 and intermediate frame parts 5. The air conditioning cabinet 1 is further provided with an intake 6 for air as well as an outlet 7 therefor. An underframe 4 comprises continuous, lying frame parts of rolled steel so that a greater rigidity thereof is obtained. The lying frame parts at the top are also rolled in one piece.

An underframe 4 (fig. 2, 3) is constructed from panels 2 to which frame parts 3 and intermediate frame parts 5 can be attached, while corner elements 8 are arranged on the corners between the frame parts 3, which elements are preferably manufactured from plastic, which is possible as the bearing function of the underframe is determined by the panels and the frame parts. Received between the panels 2 are intermediate frame parts 5 over which covering strips 10 can be snapped in to obtain a smooth finish.

Attached under the base of fig. 2 is a base frame 11, preferably with self-tapping screws 12 (see fig. 3).

As can be seen in fig. 2 and 3, the underframe 4 is assembled on its head or on its side, whereafter it is placed onto the base frame 11 for fixing of further frame parts and panels.

As shown in fig. 4, each panel 2 is placed and screwed fixedly onto the frame parts 3 with self-tapping screws, wherein the corner pieces 8 are arranged between the frame parts (and intermediate frame parts).

Since the fixedly screwed panels provide sufficient sturdiness and rigidity the constructing of a frame of frame parts prior to fixing of the panels can be omitted. The frame parts 3 are connected, except by way of the fixedly screwed panels 2, only by the corner pieces consisting preferably of plastic. If a frame were to be constructed herefrom it could easily tip over before an air conditioning cabinet 1 is constructed in its entirety.

If in an embodiment (not shown) supporting corner pieces, for instance of metal, are arranged, it is then however possible to construct an entire frame before the panels are fixed thereto.

Panels 2 (fig. 5, 6, 7 and 8) preferably comprise an inner panel 13 of identical form, between which insulation material is received. Using screws 14 a common flange 15 of the inner and outer panels 12, 13 is screwed fixedly to a frame part 3. A panel is fixed to an intermediate frame part in the same manner.

For insulation, (foam-like) insulation material can likewise be arranged in a frame part 3.

In order to increase their strength frame parts 3 are preferably constructed from rolled steel, wherein holes for the screws 14 are pre-drilled. The rolled frame parts 3 will usually be manufactured outside the factory where the air conditioning cabinets are assembled, as the remaining components are obtained via plate metal working techniques. The profile parts 3 are then preferably supplied provided with a sealing strip 16 which serves for airtight sealing of the panels against the frame part 3.

Because an air conditioning cabinet constructed according to the present invention forms a very rigid whole, holes can be drilled both in the profile part 3 and in the panel at the desired tolerances.

The screws 14 are preferably covered using a plastic sealing strip 16.

The frame parts 3 are provided with securing portions 36 which extend at the inner side of the inner panel (fig. 5, 6).

Securing faces 37 of the securing portions 36 are secured by means of the screws 14 to both the inner 12 and outer 13 panel.

As can be seen in fig. 6, with the exception of the base frame 11, no components are required for constructing the underframe 4 other than the frame parts 3 (of different size) and panels 2.

Fig. 7 shows in detail how an intermediate frame part 5 is received between two panels 2, which part is provided with a tube portion 17 and a widening protruding portion 18 standing away therefrom. Screws 14 for fixing the panels 2 are fixedly screwed into the tube portion 17, while a covering strip 19 can be snapped in over the protruding portion 18 in order to provide a smooth and plane appearance of the outer wall of the cabinet. If desired the profiled strip 19 can consist of plastic so

that the metallic protruding portion 18 is isolated from the outside environment. This covering strip is however preferably embodied in rolled metal plate.

In order to obtain a greater insulation value of a profile part 30 (fig. 8), this can be built up of an outer profile part 31 and an inner profile part 32, between which can be arranged strips of insulation material 33. An additional heat insulating strip 35 between inner and outer panel can be arranged for this same purpose.

An intermediate frame part 5 can, in a manner not shown, also take a divided form.

Another preferred embodiment of an assembly of components for an air conditioning cabinet is shown in fig. 9, wherein, for an embodiment without cold bridge, strips of insulation material 42 are arranged between flange portions of inner panel parts 40 and outer panel parts 41. A standing frame part 43 is constructed in one piece, preferably of rolled steel. Placed around that frame part 43 is a layer of insulating material, for instance felt 44, whereafter an outer edge profile part 45 is snapped thereover. For finishing, plastic covering strips 46, 47 are then pressed on fixedly. The embodiment shown in fig. 9 has the further advantage that the outer edge profile part 45 can move slightly, whereby the covering strips 46, 47 can be pressed more easily into the channels remaining in the outer wall.

In another embodiment of an assembly of components for an air conditioning cabinet (fig. 10) an inner panel part 51 is fixedly screwed to a frame part 53 using a screw 52, wherein a covering cap 55 is pressed over the hole required in an outer wall panel part. In the same manner (not further shown), inner panel part 51 is fixed to intermediate frame part 56. The embodiment shown in fig. 10 has the advantage that the arranging of the plastic cover profiles can be omitted. The embodiment shown in fig. 10 is particularly suitable for small air conditioning cabinets which should be assembled as simply as possible, since for reasons of cost the fewest possible components must be used.

Fig. 11 shows a perspective view of a component 60 which can be screwed fixedly through a screw hole 61 to flange portions of the embodiments shown in fig. 5 and 9, wherein the widening, standing portions 62, 63 serve for snapping fixedly thereon of a metal covering strip which then protrudes slightly at the sides over a corner frame part and adjoining panel. Snapping in metal covering strips over components 60 typically manufactured from plastic is less labour-intensive than fixing, usually with great force, the plastic covering strips as shown in fig. 5, 8 and 9. Moreover, with use of components 60 and the metal covering strip, the same metal covering strip can be used for both the embodiments shown in fig. 5 and in fig. 9, that is, respectively the double-walled embodiment and the double-walled embodiment without cold bridge, although in the embodiment shown in fig. 9 a slightly broader channel is present between edge frame part 45 and outer panel 51 than in the embodiment shown in fig. 5.

The shown preferred embodiments of the present invention have among others the following advantages:

- an air conditioning cabinet is easily constructed with a very limited number of components;
- it has been found in tests that the constructed air conditioning cabinet has an astonishing strength and rigidity;
- the air conditioning cabinet has a smooth finish both internally and externally so that as little dirt and dust and the like as possible remains behind in dead corners;
- the base or the underframe of the air conditioning cabinet is constructed using the same components as the side walls and top wall; and
- the frame parts are manufactured from rolled steel, which is possible in larger quantities and entails lower costs than the manufacture of plate steel parts, while with the same plate thickness they have a greater strength and can be pre-drilled during manufacture, whereby assembly can be speeded up.

## Claims

1. An air conditioning cabinet (1), comprising an underframe (4), one or more lying frame parts (3) and/or intermediate lying frame parts (5), of which the lower lying frame parts (3) are fixed to said underframe (4), a number of upright frame parts (3) and/or intermediate upright frame parts, and a number of panels (2) including inner and outer panels and provided with fixing flanges (15) fixed to one or more frame parts (3) and/or intermediate frame parts (5), by screw means (14) screwable from the exterior of the air conditioning cabinet wherein the frame parts (3) and/or intermediate frame parts (5) show a hollow construction wherein the tip ends of the screw means (14) extend into said hollow construction, and wherein the outer surface of the inner panel (2) is substantially aligned with the inner surface of the frame part (3) and/or intermediate frame part (5) to yield a substantially constant smooth inner surface, characterized in that said hollow construction of the frame parts (3) and/or intermediate frame parts (5) are made from a closed uninterrupted piece of metal (3), including one or more protruding securing portions (36) extending at the inner side of said air conditioning cabinet aligned with the inner panel (2), and said securing portions (36) having securing faces (37) spaced both from the inner and outer side of said cabinet (1), to which securing face (37) both the inner (12) and the outer panel (13) are secured.
2. An air conditioning cabinet according to claim 1, wherein the frame parts (3) and/or intermediate frame parts (5) are manufactured from rolled steel

having screw holes predrilled therein.

3. An air conditioning cabinet according to claim 1 or 2, wherein the intermediate frame parts (5) have a widening protruding portion (19).
4. An air conditioning cabinet (1) according to claim 3, provided with a covering strip (10) which can be snapped onto the widening protruding portion (19).

#### Patentansprüche

1. Klimaanlage (1) mit einem Untergestell (4), einem oder mehreren liegenden Rahmenteil(en) (3) und/oder Zwischenrahmenteil(en) (5), von denen die unteren, liegenden Rahmentile (3) an dem Untergestell (4) befestigt sind, mehreren stehenden Rahmenteil(en) (3) und/oder zwischenliegenden, stehenden Rahmenteil(en), und mehreren Wandelementen (2), die Innen- und Außenwände aufweisen und mit Befestigungsflanschen (15) versehen sind, die an einem oder mehreren Rahmenteil(en) (3) und/oder Zwischenrahmenteil(en) (5) befestigt sind mittels von außerhalb des Klimaschutzes einschraubbaren Schraubmitteln (14), wobei die Rahmentile (3) und/oder Zwischenrahmentile (5) einen hohlen Aufbau haben, wobei die Spitzenenden der Schraubmittel (14) sich in den hohlen Aufbau erstrecken und wobei die Außenfläche der Innenwand (2) im wesentlichen fluchtet mit der Innenfläche des Rahmenteil(s) (3) und/oder des Zwischenrahmenteil(s) (5), um eine im wesentlichen gleichbleibende, glatte Innenfläche zu erzielen, dadurch gekennzeichnet, daß der hohle Aufbau der Rahmentile (3) und/oder der Zwischenrahmentile (5) aus einem geschlossenen, ununterbrochenen Stück aus Metall (3) ist, das einen oder mehrere vorstehende Befestigungsabschnitte (36) aufweist, die sich an der Innenseite des Klimaschutzes erstrecken und mit der Innenwand (2) fluchten und daß die Befestigungsabschnitte (36) Befestigungsflächen (37) aufweisen, die sowohl von der Innenseite wie auch von der Außenseite des Schutzes (1) beabstandet sind, wobei sowohl die Innenwand (12) wie auch die Außenwand (13) an der Befestigungsfläche (37) befestigt sind.
2. Klimaanlage (1) nach Anspruch 1, wobei die Rahmentile (3) und/oder Zwischenrahmentile (5) aus Walzstahl mit darin vorgebohrten Schraubenlöchern hergestellt sind.
3. Klimaanlage (1) nach Anspruch 1 oder 2, wobei die Zwischenrahmentile (5) einen aufweitenden, vorspringenden Abschnitt (19) aufweisen.
4. Klimaanlage (1) nach Anspruch 3, versehen

mit einer Abdeckleiste (10), die auf dem aufweitenden, vorspringenden Abschnitt (19) angeklipst werden kann.

#### Revendications

1. Meuble (1) de conditionnement d'air, comprenant un bâti inférieur (4), un ou plusieurs composants (3) de bâti horizontaux, et/ou des composants (5) de bâti horizontaux intermédiaires, dont les composants (3) de bâti horizontaux inférieurs sont fixés audit bâti inférieur (4), un certain nombre de composants (3) de bâti verticaux et/ou de composants de bâti verticaux intermédiaires, et un certain nombre de panneaux (2) comprenant des panneaux intérieurs et extérieurs munis de brides (15) de fixation fixées à un ou plusieurs composants (3) de bâti et/ou composants (5) de bâti intermédiaires, à l'aide de moyens de vissage (14) vissables de l'extérieur du meuble de conditionnement d'air, dans lequel les composants (3) de bâti et/ou composants (5) de bâti intermédiaires présentent une construction creuse dans laquelle les extrémités de pointe des moyens de vissage (14) s'étendent à l'intérieur de ladite construction creuse, et dans lequel la face extérieure du panneau intérieur (2) est sensiblement alignée avec la face intérieure du composant (3) de bâti et/ou du composant (5) de bâti intermédiaire pour permettre d'obtenir une surface intérieure lisse sensiblement constante, caractérisé en ce que ladite construction creuse des composants (3) de bâti et/ou des composants (5) de bâti intermédiaires est réalisée à partir d'une pièce de métal (3) continue fermée, comprenant une ou plusieurs parties de fixation saillantes (36) s'étendant sur la face latérale intérieure dudit meuble de conditionnement d'air alignée avec le panneau intérieur (2), et lesdites parties de fixation (36) comportant des faces de fixation (37) espacées à la fois de la face latérale intérieure et de la face latérale extérieure dudit meuble (1), auxquelles faces de fixation (37) sont fixées à la fois la face intérieure (12) et la face extérieure (13).
2. Meuble de conditionnement d'air selon la revendication 1, dans lequel les composants (3) de bâti et/ou composants (5) de bâti intermédiaires sont fabriqués à partir d'acier laminé dans lequel sont prépercés des trous de vis.
3. Meuble de conditionnement d'air selon la revendication 1 ou 2, dans lequel les composants (5) de bâti intermédiaires présentent une partie saillante (19) s'élargissant.
4. Meuble (1) de conditionnement d'air selon la revendication 3, muni d'une bande de recouvrement (10)

qui peut être enclenchée sur la partie saillante (19)  
s'élargissant.

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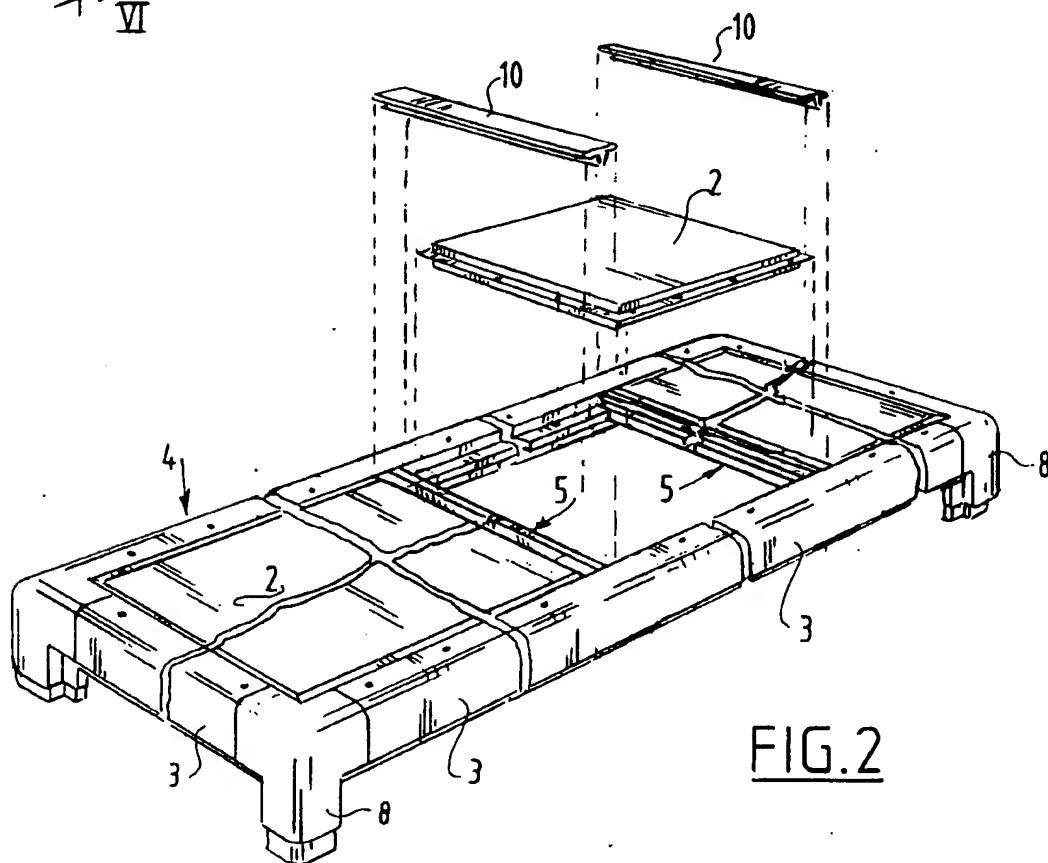
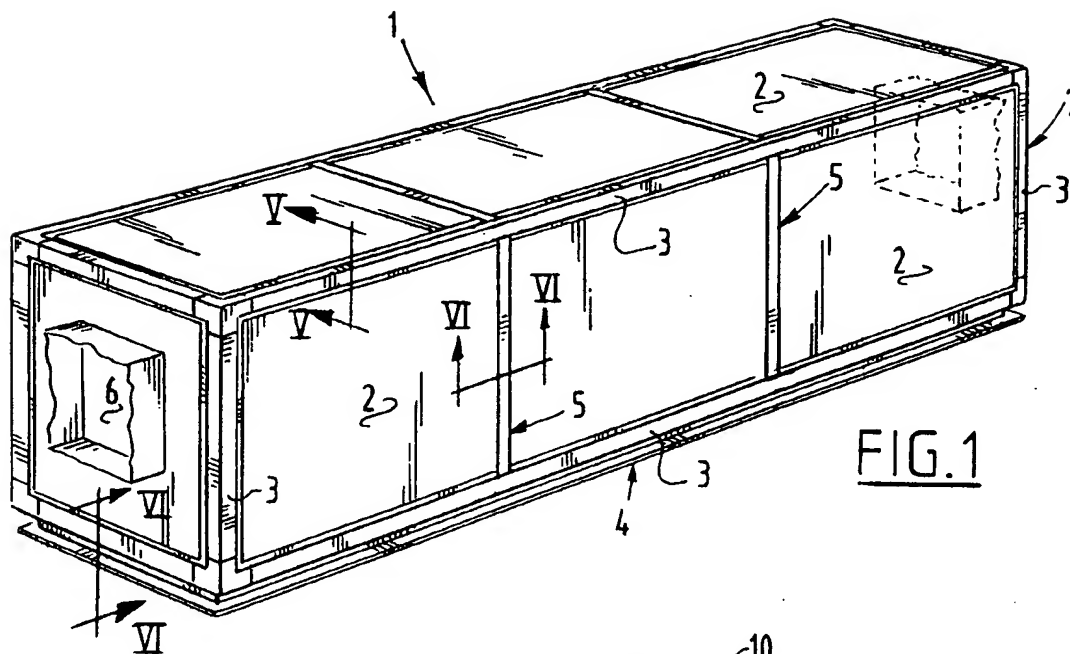
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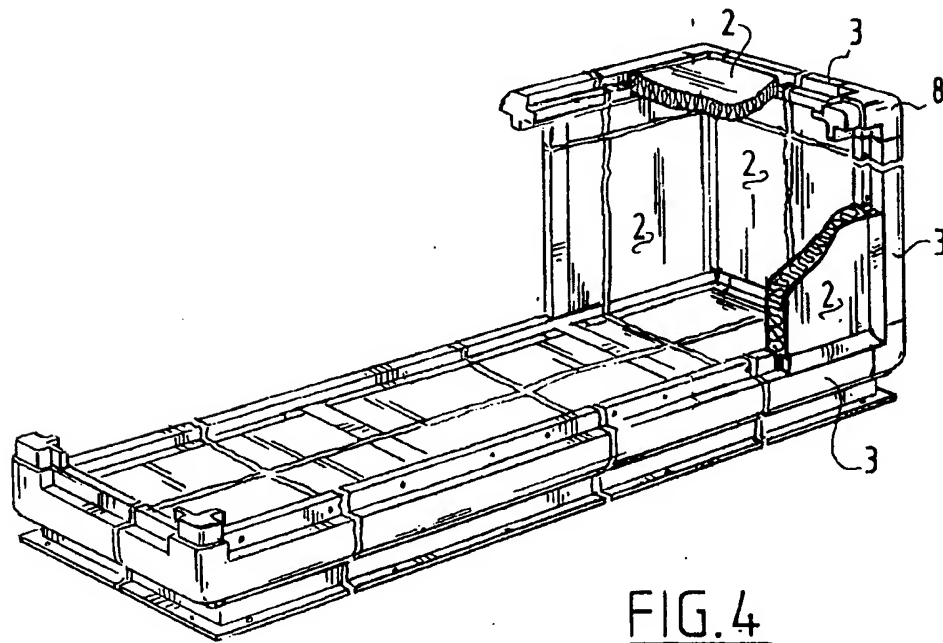
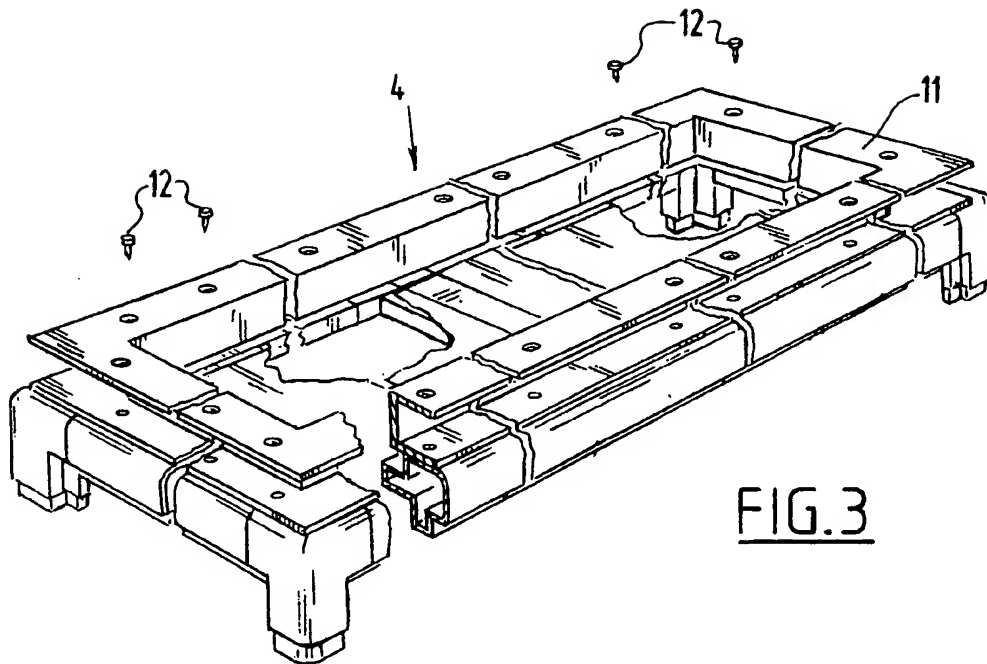
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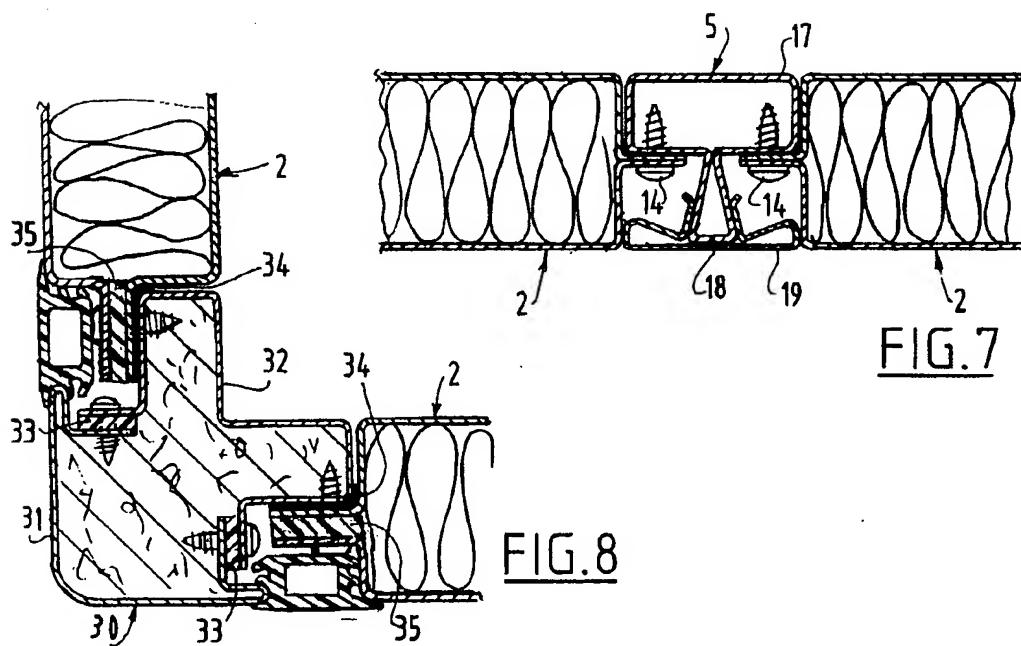
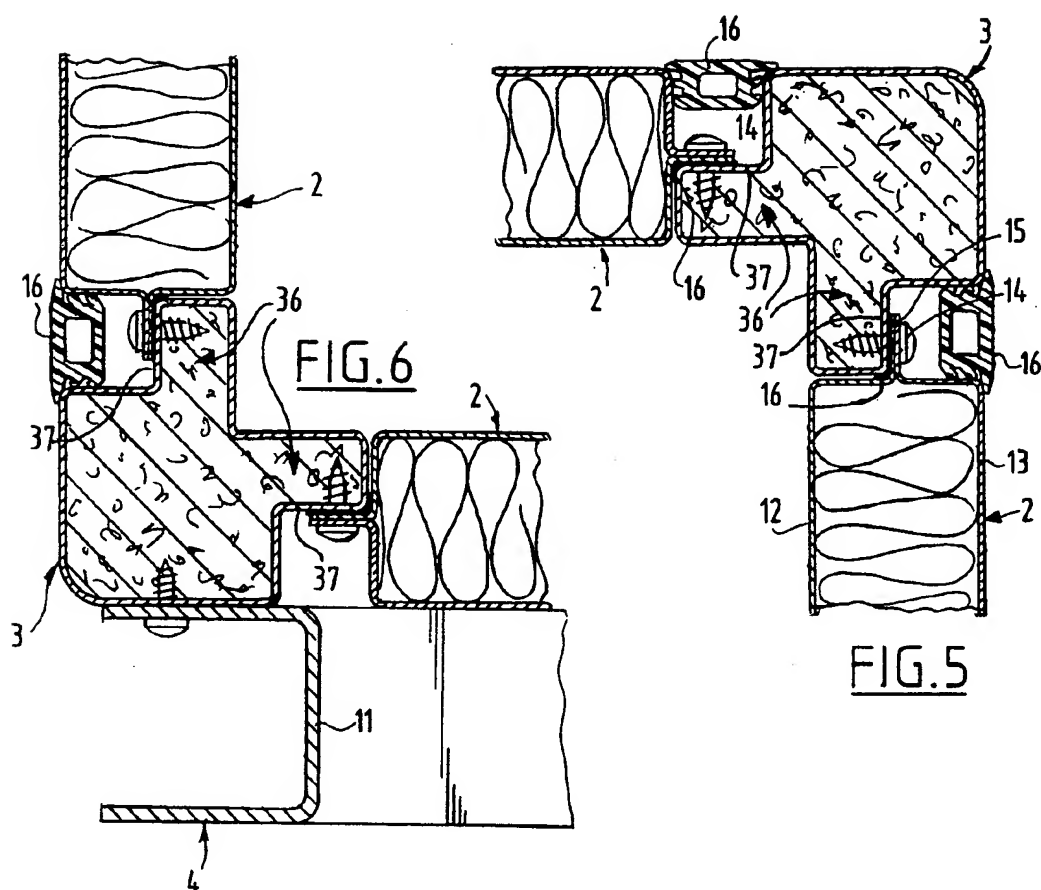
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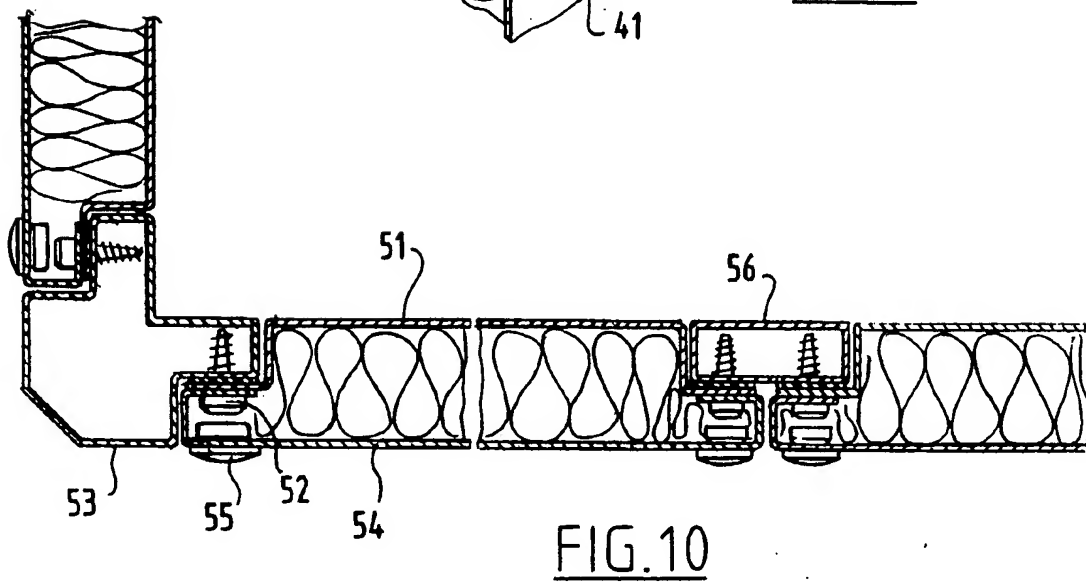
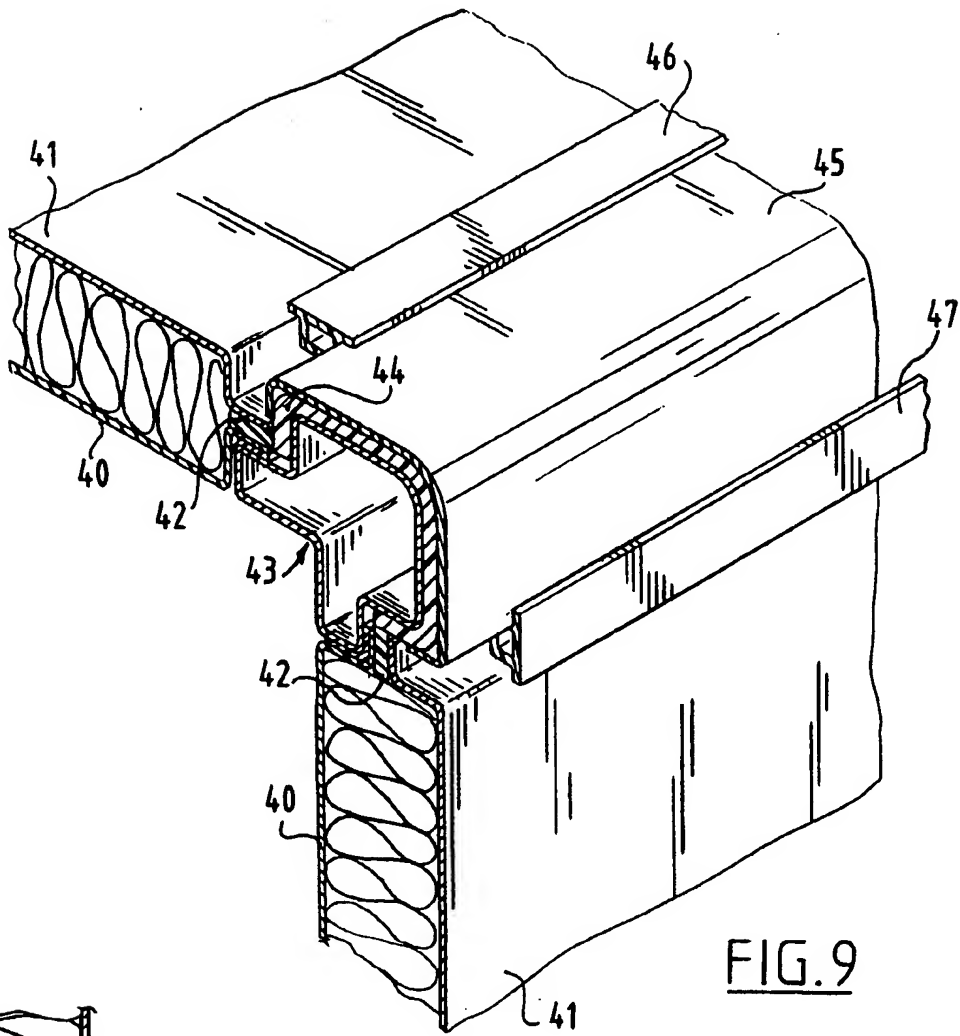
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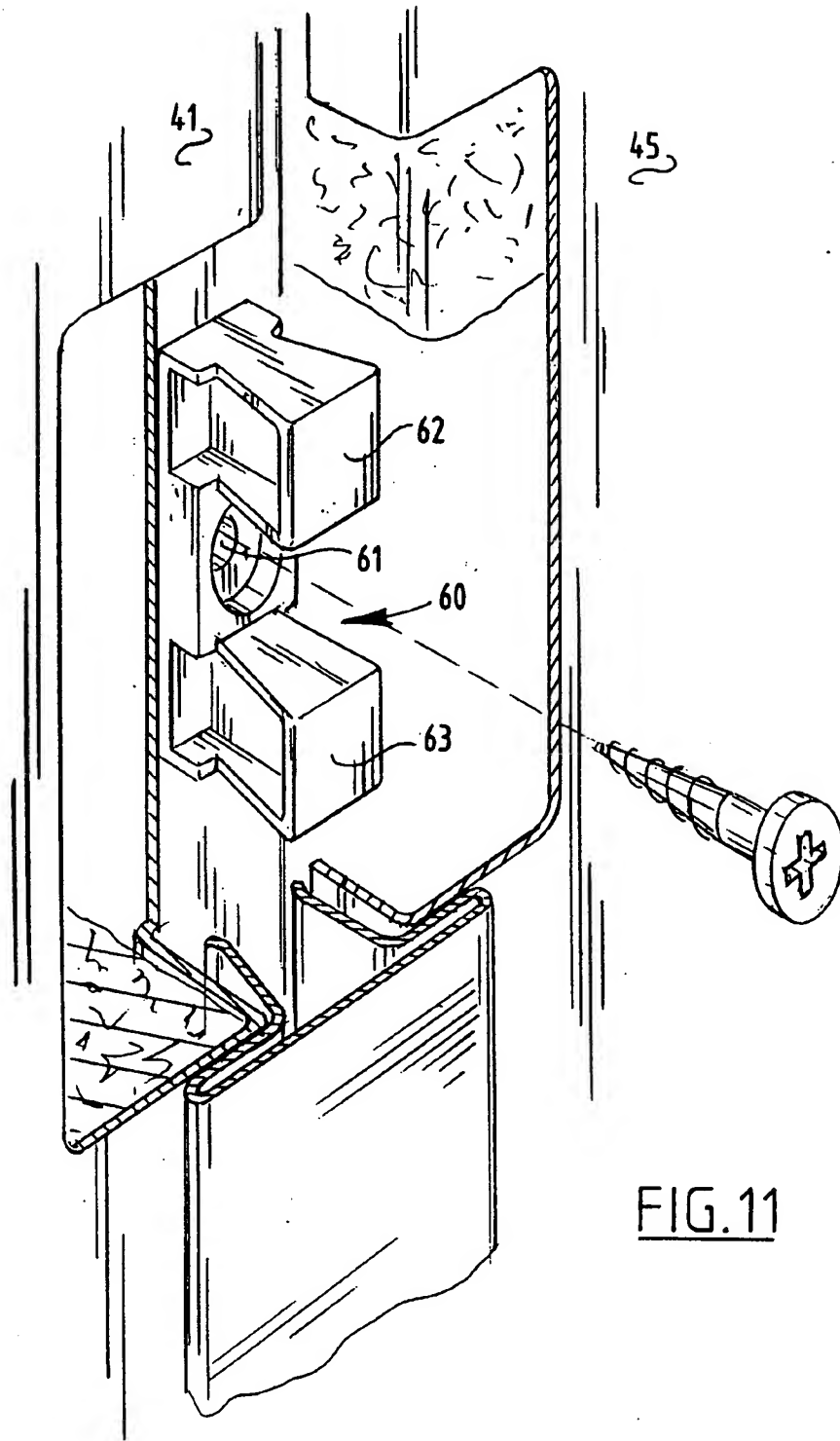


FIG. 11

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